3430 Forest Insect and Disease Evaluation December 18, 1978

Seed Production Site Evaluation, Randle and Mt. Adams Ranger District

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On October 12 and 13, Gregory M. Filip, Pathologist, examined two sites on the Randle Ranger District and one site on the Mt. Adams Ranger District. The Forest is considering developing these sites for tree seed production. Greg evaluated the sites for diseases that could adversely affect the proposed plantings. He was accompanied by Sheila Martinson, S.O. Forest Orchardist, and Ernie Garcia, Wildlife Biologist, from the S.O.

The first site they visited was located at French Butte (T. 10 W., R. 7 E., secs. 4 and 9) on the Randle Ranger District. The site is a proposed noble fir seed orchard (34 acres). The present stand consisted of pole to sawtimber size noble fir and Douglas-fir and sapling to pole size hemlock and white pine. Following removal of all existing trees, the site will be planted to noble fir on a 20 x 20 foot spacing.

The most conspicuous disease on the site was white pine blister rust. Almost every white pine was infected. Since only noble fir is to be planted, there will be no risk to the plantings from this disease.

Dwarf mistletoes were not observed on any of the trees within the proposed orchard area or immediately surrounding it.

Root diseases were not observed in any of the trees on the site. It is not recommended that stumps be removed. However, this should not be interpreted as a recommendation to keep the stumps. The majority of stumps created by tree harvesting will be very small and should decompose rapidly. The few large noble fir stumps resulting from clearing should be treated with borax immediately following tree harvesting to prevent possible airborne infection by *Fomes annosus*. Stump removal would probably be beneficial, but the costs of the operation would far outweigh the risks in this stand.

The second site they visited was located near the Cispus River (T. 11 W., R. 7 E., secs. 16 and 17) on the Randle Ranger District. The site is a proposed Douglas-fir seed orchard (24 acres). The former stand which consisted of old-growth Douglas-fir with some western hemlock was clearcut a few years ago. Several large stumps (greater than 50 inches at the groundline) remained on the site. Many of the Douglas-fir stumps had advanced decay caused by *Polyporus schweinitzii*, which is common in old-growth Douglas-fir. Trees less than 100 years old are not affected.

No other root diseases were observed infecting Douglas-fir stumps. Most of the hemlock stumps (20-30 inches) were infected with *Armillaria mellea*. This disease spreads from residual stumps to living trees via root contacts and rhizomorphs. Since there were no living trees on the site at the time of the examination, future mortality potential could not be directly evaluated. However, mortality caused by *Armillaria* was present in Douglas-fir saplings in an adjacent plantation containing hemlock stumps.

It is recommended that at a minimum, all hemlock stumps be uprooted and not merely ground flush with the soil line. *Armillaria* colonizes large stumps and uses them as a food base. Uprooting of stumps will kill the fungus by desiccation and thus minimize infection of plantings. Although the Douglas-fir stumps did not appear to be infected by root pathogens that would affect the plantings, pathogens may be present on roots below the groundline. However, on this site, disease is more likely to occur in trees planted around hemlock stumps than around Douglas-fir stumps. It would be desirable to excavate a small number of Douglas-fir stumps so roots can be examined. If such an examination shows extensive colonization by root disease fungi, the Douglas-fir stumps should also be removed.

Dwarf mistletoe was not observed in the surrounding stand.

The third site they examined was located at Peterson Prairie (T. 6 W., R. 9 E., sec. 35) on the Mt. Adams Ranger District. The site is a proposed white pine seed orchard (20 acres). Blister rust resistant white pine, which are being screened at Dorena, will be planted.

The former stand consisted primarily of western hemlock, true fir, and Douglas-fir. Several 15 to 24 inch stumps remained after the clearcut. Examination showed that over half of the hemlock-true fir stumps were infected by *Armillaria mellea*. Some of the stumps had advanced decay caused by *Phellinus (Poria) weirii*. There were no living trees on the site (except for seedlings) to adequately assess the mortality potential of the site. White pine poles in an adjacent plantation had mortality caused by *Armillaria*. Many also had blister rust.

It is recommended that all the stumps on the proposed site be removed. The incidence of stump infection is high, and transmission of disease to plantings could be a serious problem. Although white pine is somewhat tolerant of infection by *P. weirii*, it appears to be susceptible to infection and mortality caused by *Armillaria*, especially in artifically regenerated stands. Stump removal will minimize infection and mortality in the planted white pine.

Although blister rust is present in the adjacent stand, it should not pose a serious problem in the seed orchards since resistant stock is being planted. In fact, blister rust in the neighboring stands can be beneficial in that it could serve to eliminate individual trees with low levels of resistance.

Dwarf mistletoe was not observed in the stand surrounding the proposed seed orchard.

We do not see diseases as being a limiting factor in establishing the three seed orchards if recommendations concerning stump removal are followed. We ask that FIDM be contacted when stumps are being excavated to assess the amount of actual stump infection present.

Stan Meso, Entomologist, inspected the three potential seed orchard sites with Shelia Martinson on Thursday, November 2. Burt Gossard from the Randel Ranger District guided us to the French Butte and Cispus River locations. The French Butte site will be developed for noble fir seed production. The elevation of this area is about 4,200 feet and it is situated in the heart of the most productive noble fir timber stands on this District. Future noble fir seed production at French Butte will be directly affected by several insect species. Two species of fir-cone maggot, *Earmoyia aquilonia* and *Earmoyia abietum*, feed directly in the developing seeds and move from seed to seed. Two fir-seed chalcids, *Megastigmus pinus* and *Megastigmus rafni*, feed and remain in the seed. These insects seriously affect fertilized seeds, and infested seeds are difficult to detect and to sort because they weigh about the same as filled sound seed. The greatest impact on seed yield will be caused by the cone moths, *Eucosma siskiyouana*, fir coneworm, *Dioryetria abietivorella*, and the fir seed moth, *Laspeyresia bracteatana*. To insure a consistent yield of seed when this orchard becomes productive, a direct insect control program will have to be developed and used. This will involve close planning with the seed orchard manager and the FIDM staff.

The Cispus River seed orchard site will be planted with Douglas-fir. If genetically improved seedlings are used, direct insect impact will be delayed until the trees begin producing cones. When grafting takes place, the fir coneworm,

Dioryctria abietivorella, will infest some of the grafts soon after the grafting bands are removed. Graft losses are not usually high but extra grafting efforts will be needed when cone production begins in this orchard. The fir coneworm, Douglas-fir cone moth, *Barbara colfaxiana*, Douglas-fir seed chalcid, *Megastigmus spermotrophus*, and the western conifer seed bug, *Leptoglossus occidentalis*, will be among the first insects that will have a direct impact on seed yield because these insects are very mobile. The surrounding Douglas-fir stands will maintain populations of these insects which will move into the orchard when consistent cone production begins. The weaker flying cone midges which include the Douglas-fir gallmidge, *Contarinia oregonensis*, and the Douglas-fir scale midges, *Contarinia washingtonensis* and *Camptomyia pseudotsuga*, will move into the orchard gradually as the trees increase their cone yield. A cone and seed insect control program will have to be developed before the trees become fully productive and used to insure a dependable yield of Douglas-fir seed.

The Peterson Prairie site on the Mt. Adams Ranger District is located in the center of a large clearcut block. Screened western white pine seedlings will be planted at this 20 acre location. This orchard will physically be isolated from the surrounding Douglas-fir, hemlock, true fir stands. The two insects that will have an impact on the white pine cone and seeds will be the fir coneworm, *Dioryctria abietivorella*, and the western conifer seed bug, *Leptoglossus occidentalis*. Their impact will occur when the trees become productive. An insect monitoring program will have to be developed at the orchard during the mid 1980's to measure insect population and seed loss levels. A direct insect control program will be needed to prevent seed loss caused by these two insect species.

The FIDM staff will provide additional assistance when needed.

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for

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